Operating instructions

broncolor
Grafit 2/4

Before use

Please read all the information contained in these operating instructions carefully. They contain important details on the use, safety and maintenance of the appliance. Keep these operating instructions in a safe place and pass them on to further users if necessary.
Observe the safety instructions.

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Important safety instructions

When using your photographic equipment, basic safety precautions should always be followed, including the following:

1. Read and understand all instructions before using.
2. Close supervision is necessary when any appliance is used by or near children. Do not leave appliance unattended while in use.
3. Care must be taken as burns can occur from touching hot parts.
4. Do not operate appliance with a damaged cable or if the appliance has been dropped or damaged - until it has been examined by a qualified serviceman.
5. Position the cable so that it will not be tripped over, pulled, or contact hot surfaces.
6. If an extension cable is necessary, a cable with a current rating at least equal to that of the appliance should be used. Cables rated for less amperage than the appliance may overheat.
7. Always unplug appliance from electrical socket before cleaning and servicing and when not in use. Never jerk cable to pull plug from socket. Grasp plug and pull to disconnect.
8. Let appliance cool completely before putting away. Loop cable loosely around appliance when storing.
9. To reduce the risk of electric shock, do not immerse this appliance in water or other liquids.
10. To reduce the risk of electric shock, do not disassemble this appliance, but take it to a qualified serviceman when service or repair work is required. Incorrect reassembly can cause electric shock when the appliance is used subsequently.
11. The use of an accessory attachment not recommended by the manufacturer may cause a risk of fire, electric shock, or injury to persons.
12. Connect this appliance to a grounded socket.

Attention:
Read before starting up the power pack

- Prior to replacing fuses, light bulbs or flash tubes, discharge the power pack and disconnect from power supply. Disconnect the lamp base from the power pack.
- These units are designed for use in dry conditions. Protect them from water and from excessive exposure to dust.
- The units are not suitable for use in an environment where there is a risk of explosion.
- The accessories mounted onto the lamp bases may heat up to high temperatures under specific conditions. Handle with care!
- With due allowance for heat radiation, lamp bases with more than 100 W modelling light may be directed against inflammable surfaces only at a minimum distance of 1 m.
- For safety reasons, never operate the lamps without the protecting glass in place.
- Flash light contains, similar to sunlight, a specific portion of UV light. The undesirable side effects on skin and eyes are considerably reduced by using flash tubes and glass covers with a UV coating. Without these or other protective filters, use with extreme care when shooting.
- Even when disconnected from the power supply, dangerous voltages may remain inside the unit. For this reason units should be opened by trained personnel only.
- Do not block the cooling louvers on the unit.
- **broncolor** power packs and lamp bases meet an extremely high safety standard. When connecting **broncolor** products to other manufacturers' products, integrated safety measures may become ineffective. Due to different design features and contact assignment of the lamp plugs of other makes, the user himself/herself may even be at risk. We offer no guarantee and accept no liability for damages which may be caused by this type of usage.

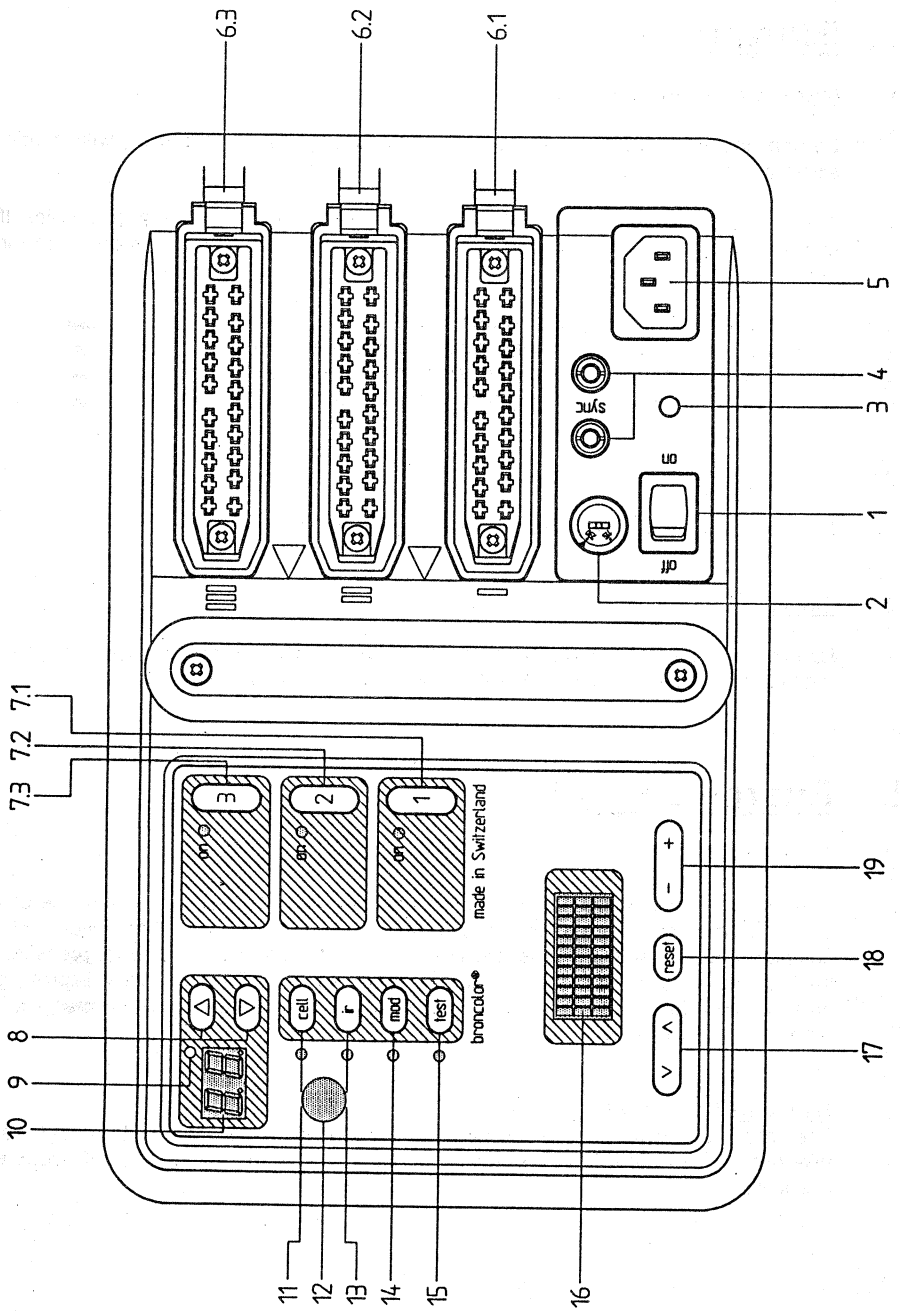
Controls and displays

1. Mains switch
2. Voltage selector 110V/230V
3. Circuit breaker
4. Sync socket
5. Connection socket for mains cable

6.1 Outlet I
6.2 Outlet II
6.3 Outlet III

7.1 Lamp base switch 1, on/off
7.2 Lamp base switch 2, on/off
7.3 Lamp base switch 3, on/off

8. Master power selector +/-
9. Slave cell
10. Digital master power display
11. Slave cell on/off
12. IR receiver cell
13. IR receiver on/off
14. Modelling light on/off
15. Test key, ready light green
16. 4 line LCD display
17. Cursor up/down
18. Reset key
19. Auxiliary functions setting key



1. Startup

1.1 Mains voltage / voltage selector

Set the unit on the required mains voltage by turning voltage switch (2) with a coin or screwdriver.

The unit is designed for 230 V, 120 V or 100 V according to voltage of country. If a different voltage than the original one is selected, the following limitations come into force:

230 V unit on 120 V:	Can only be operated with power upto level 9. The charging time becomes longer.
120 V unit on 230 V:	The recycling time becomes longer
100 V unit on 230 V:	The recycling time becomes longer

1.2 Earthed Mains (AC-line)

Connect unit to current supply always using earthed mains plug.

1.3 Startup

Use the mains (AC-line) switch (1) to power-up unit. During the charging process the digital master power (10) flashes, after which, it becomes continuous.

2. Energy control

2.1 Grafit 2/4

Use the "+/-" keys (8) to control the flash energy (flash intensity) within a range of 4 f-stops. A value of 10 in the display indicates maximum intensity, 6 minimum. Whole numbers are full f-stop intervals, decimals indicate 1/10 f-stop steps. Brief pressure on the "+/-" keys, (8) runs the power up (or down) by a 1/10 f-stop interval, prolonged pressure by a full f-stop. The display (10) then blinks until charging or discharging has stabilized the new level.

2.2 1/10 or 1/3 f-stop increments control

The fractional power level adjustment can be programmed for 1/10 or 1/3 f-stop intervals; the units are factory set to 1/10 steps. For reprogramming to 1/3 steps see chapter 7.

3. Lamp base outlets

Lamp base outlets of the Grafit units are marked with the Roman numerals I to III.

All outlets may be switched individually (7.1, 7.2, 7.3). For newly connected lamp bases, the connection will be automatically activated.

4. Modelling light

4.1 The "mod" key (14) switches on the modelling lamps for all connected lamp bases. When switched on, the green LED (Liquid Electronic Display) lights up. Lamp bases also have an additional modelling lamp switch. You may also operate the modelling light proportionally (Chapter 4.2) and adapt it to the various maximum outputs of **broncolor** power packs.

4.2 Proportionality

In chapter 7 is an explanation of how to set the various operating modes (modelling light proportionality).

Stages prop1, prop2, prop3, prop4 and prop5 are used to adapt the modelling light brightness of power packs with different output. The setting "modelling light proportional" duly allows for the output set and the number of lamps.

Proportionality is guaranteed if the identical operating mode has been set for all power packs. The higher the digit, the brighter the modelling light.

The following operating modes are possible:

"prop1"	This level allows matching of the Grafit units to the proportional control of the Pulso 8 power pack.
"prop2"	Proportional modelling light - brightest level with Grafit A4, 4.
"prop3"	Proportional modelling light - brightest level with Grafit A2, 2.
"prop4/5"	If you use a power pack with less power it is known that the halogen modelling light is relatively weak and yellowish. To solve this problem the power packs have been provided with two additional proportional light levels. If the power of the Grafit 4 is lower than "8.0" and of the Grafit 2 lower than "9.0" you can increase the modelling light immensely with "prop4".
	If the power of the Grafit 4 is lower than "7.0" and of the Grafit 2 lower than "8.0" you can increase the modelling light immensely with "prop5".
"full"	All lamp bases with full modelling light, independent of flash output, type of power pack and output distribution.
"low"	Lighting level reduced for all lamps to reduce power consumption and extend the burning life of the tungsten-halogen lamps.

Proportionality settings when combining packs of different output:

	Grafit 2, A2 Opus 2, A2 Pulso 2, A2	Grafit 4, A4 Opus 4, A4, A8 Pulso 4, A4	Pulso 8
Grafit 2, A2 Opus 2, A2 Pulso 2, A2	3	2	1
Grafit 4, A4 Opus 4, A4, A8 Pulso 4, A4	2	2	1
Pulso 8	1	1	1

Example 1: A power pack Grafit 2 is operated together with a power pack Pulso 8. The modelling light is proportional when both are set to mode "prop1".

Example 2: A power pack Grafit 4 is operated together with Grafit 2. The modelling light is proportional when both are set to mode "prop2".

4.3 Reduced modelling light intensity

To avoid overloading the mains supply (AC-line), the 100-120 volt versions of the power packs reduce the modelling light intensity during charging. You can clear this factory-installed program if the power rating of the mains supply (AC-line) is sufficient - see key combinations in section 7.10 of the programming additional functions. When working with limited-power on the mains supplies (AC-line) you can also slow down the charging rate with the additional functions "slow charging" - this reduces the risk of blowing the supply fuses.

4.4 Modelling light switch on lamp base

The switch on lamp bases permits selective lighting control with the modelling light. To avoid damage to the lamp filament, always switch off the modelling light before moving the lamp base.

5. Release and remote control

5.1 Slave cell (cell) and Infrared receiver (IR)

The slave cell can be switched on or off by using the "cell" key (11), the infrared receiver by using the "ir" key (13). If they are activated the green LED light(s) up.

After a flash sequence the slave cell, if activated, is blocked and the green indicating lamp blinks. By pressing the "cell" key the cell is re-activated.

5.2 Infrared flash channels

You can trigger Grafit power packs from broncolor infrared transmitters. These have two different channels. Setting instructions are stated in chapter 7.

If a power pack is triggered via infrared, the flash release follows with a time delay. If the setting of the IR channel is "all" the delay is 1/1000 s, if the setting is selective it is 1/500 s.

Important: when selective triggering is selected, all units in operation must be set to 1 or 2 (none on "all") and all the photo cells should be switched off.

5.3 Sync socket (4)

Synchronous cables art. no. 34.111.00 or 34.112.00 may be plugged into the socket to release flashes via cable.

5.4 "Test" key (15)

This key (15) allows manual release of the power pack as soon as 70% of the set energy is available.

5.5 Remote Control

The remote control of the power pack Grafit is operated by the Remote Control units Servor 3 and Servor e. If the power pack is switched to "stand-by" via the remote control unit, the decimal point of the main display will blink. The power pack can be "re-activated" either by the remote control unit or by pressing any button on the front panel.

5.6 Servor power pack addresses

Addresses will be assigned to each power pack for individual control. This is explained in chapter 7.

5.7 Servor remote control channels

Remote control may be performed via 2 separate channels (studio work stations). This is explained in chapter 7.

6. Flash ready signals visual/audible

6.1 The **visual ready signal** is the green LED at the "test" key (15). It lights up only when the unit is fully charged. After a flash this LED goes out and lights up again when the unit is fully charged once more.

6.2 The **audible signal** "buzzer" sounds when the power capacitors are at 100% charge. It may be switched on or off. This is explained in chapter 7.

6.3 Audible fault signal
When the flash discharge fails, a warning signal of approx. 3 s duration will sound and the display of the relevant lamp base will flash.

7. Setting additional functions

Meaning of additional symbols on display

■ Indicates that one or several additional functions are active

! Frames fault / alarm messages

Suggested default value for a certain setting

Function	possible settings
With the taggle-key v ∧ (17, on the front panel at the bottom left) the cursor can be moved up or down to select the various functions.	With the +/- key (19, on the front panel at the bottom right) different settings can be made.
7.1 ***Lamp 3, 2, 1 (LAMP 3, 2, 1)*** Display of the lamp power	- ***..J*** (joules) - ***..%*** (percentage)
7.2 ***Modelling light (MOD)*** Choice of the proportional level (see as well chapter 4.)	- ***prop1*** - ***prop2*** - ***prop3*** - ***prop4*** - ***prop5*** - ***full (FULL)*** - ***economy (LOW)***

7.3 ***Sequence (SEQ)***
In this mode you can select a number of flashes to be triggered automatically.
- ***off (OFF)***
- ***2-50***

7.4 ***Interval (INTVL)***
This function allows to define the time between the flashes and therefore to delay the flash sequence.
The interval setting cannot be used when: charging time is long and unsuitable supply voltages.
- ***off (OFF)***
- ***"delay time"*** (shortest charging time - 50.00 s)

7.5 ***Delay*** of the first flash ***(DELAY)***
You can delay triggering of the first flash by 0,01 s - 50,00 s.
- ***off (OFF)***
- ***0,01 s - 50,00 s***

7.6 ***Alternate*** (ping-pong release) ***(ALT)***
This provides the option of determining the release sequence of 2 power packs, i.e., only one power pack triggers per IR signal, while the other is at rest.
This function allows performing faster photographic sequences.
- ***off (OFF)***
- ***1*** (1. unit in succession)
- ***2*** (2. unit in succession)

7.7 ***Charging time*** (slow charging) ***(RECYC)***
In case of weak power supply lines, charging time may be extended.
- ***fast (FAST)***
- ***slow (SLOW)***

7.8 ***Memory 1 + 2 (MEMO 1 + 2)***
All setting can be stored and recalled later on.
- Press the "+" key for 2 s to store all settings (STORE)
- Press the "-" key for 2 s to recall a previously stored setting (RCL)

7.9 ***DIM (DIM)***
This function dims the modelling light during the recycling time (min. 0,5 s). It allows a visual flash control and the extinction of the modelling light during sequences.
- ***ON (ON)***
- ***OFF (OFF)***

7.10 ***Buzzer (BUZZ)***

The audible signal sounds when the power capacitors are 100% charged up. You can switch on resp. off the signal.

- ***ON (ON)***
- ***OFF (OFF)***

7.11 ***IR channel (IR)***

The Grafit power packs use two different channels for selective triggering of specific power packs or groups (studio workstations).

- ***all*** ***(ALL)*** (the unit will release on all ir signals)
- ***1*** (the ir sender must be set correspondingly)
- ***2*** (the ir sender must be set correspondingly)

7.12 ***Studio / Gen. (UNIT)***

Studio = workstation

Extended pressing of the key -/+ sets the workstation .

01/20

Momentarily only 01 or 02 can be selected with Servor.

power pack = power pack address

Brief pressure of the key -/+ sets the power pack address for remote control.

01/20

Momentarily only 01 to 08 are selectable with Servor.

7.13 ***Flash count (COUNT)***

Counts the already released flashes. By pressing extensively on the -/+ key the counter can be set back to 0.

7.14 ***Total count (TOTAL)***

Every flash discharge is counted.

7.15 ***Max. Display (DISPL)***

1/10-f-stops

The Grafit units can display flash output in 1/10 f-stops over a range of 4 f-stops. All Grafit power packs are factory-set to show values from 10 to 6. 10 indicates the maximum and 6 the minimum output level.

- **10**
- **9**
- **8**
- **7**

The display range can be shifted towards the bottom in order to correspond with units of different power (Grafit 2/4). The result will be the same number on the display for the same amount of selected power

Grafit 2	value 8	=	1600 J
Grafit 4	value 9	=	3200 J
Pulso 8	value 10	=	6400 J

10	**9**	**8**	**7**
10			
9	9		
8	8	8	
7	7	7	7
6	6	6	6
	5	5	5
		4	4
			3

1/3-f-stops

For the display in 1/3 steps the power range is shown +9 to -3.

- ***1/3***

General:

With the remote control servor 3, we recommend retaining the standard setting (maximum energy = 10) since complications in the display in the command mode "all" may arise otherwise.

7.16 ***Store Aux (AUX)***

Grafit power packs are factory-set to clear all programming function adjustments on loss of mains supply power, for whatever reason. This avoids operating errors on subsequent startup.

- ***on (ON)***
- ***off (OFF)***

7.17 ***Progr. Release (PROG)***

Shows the software release of the EPROM.

7.18 ***Country (CNTRY)***

The country code is for sale and service.

7.19 ***Delivery date*** *(DELIV)*
First operation

7.20 ***Serial number*** *(SER)*
For service and sale

Reset key

- When pressed briefly, the cursor jumps on the line "modelling light".
- When pressed for 2 s, the settings (sequence, interval, delay, alternate, charging time) are switched off.
- When pressed for more than 10 s, the unit is reset to the factory setting.

8. Protective facilities / Fault indication

Fault / alarm messages are framed with "!" characters on each line.

8.1 Cooling

The cooling fan switches to a higher speed after some flashes

8.2 Thermal overheating display

To protect against overheating after extended series of flashes, the unit will power down for a number of minutes. At that stage, the following message will appear on the LCD display:

COOL-BREAK
xx Min: Tx

The cooling time is shortened if the unit remains connected and switched on.

8.3 Afterglow

In case of afterglow of an older flash tube, the LCD display will show the corresponding message.

8.4 Circuit breaker (3)

In the event of an electrical malfunction, the circuit breaker will automatically disconnect the power pack from the power source. The unit can be restarted by pressing the circuit breaker button. If it disconnects again immediately, the power pack must be serviced by an authorised technician.

9. Lamp bases

Newly connected lamp bases are activated automatically. The lamp and accessories range of Primo and Pulso 2/4 systems may be used without restriction.

9.1 Replacing flash tubes

Prior to any change of the flash tube, the lamp base must be disconnected from the power pack!

Primo and Pulso lamp bases use plug-in flash tubes. To replace the flash tubes of Primo lamp bases, the contact spring has to be released to allow the tube to be removed. A protecting glass must be fitted over the flash tube and modelling lamp which is held in place by 3 springs. This is available in versions clear (5900 K) and UVE (5500 K).

As the Primo lamp base can be used with a 1600 J as well as with a 3200 J tube, there is a corresponding warning sticker included, which is to be affixed on the lamp plug when inserting the tube.

On Pulso 4 and Primo 4 lamp bases, the UV coating is on the protecting glass; the flash tube is clear for thermal reasons. On Primo and Pulso 2 flash tubes, the UV coating is normally applied directly on the tube. Any protecting glass used must be clear. Upon request, the Primo and Pulso 2 lamp bases can be supplied with a clear tube and a coated protecting glass.

To change the flash tube, carefully pull off the protecting glass. Pull straight, without tilting. Lamp bases manufactured from 1996 on, have the upper of the three springs holding the protection glass differently shaped to provide a better hold. When removing the protection glass it is necessary to first pull out the glass from the bottom. Release the contact spring (only Primo lamp) and again be sure to pull the flash tube straight along the lamp base axis. When inserting the tube check that the ceramic base is fully pushed back in and that the contact spring rests on the internal ignition wire (only Primo lamp).

Get an authorized servicing agency to exchange flash tubes in lamp units with fixed tubes (Boxlite, Fibrolite, etc.).

9.2 Changing the halogen lamp

Depending on the voltage version, Primo and Pulso lamp bases use either plug-in or screw-in halogen lamps. The 200-240 volt models use 650 watt pinbased lamps, the 100-120 volt models use 250 watt lamps with a screw base.

9.2.1 Primo lamp base

Both the voltage versions (120 V / 230 V), after exchanging the tungsten-halogen lamp, can be run with the other voltages. The only difference is the modelling lamp socket which depends on the voltage used:

- 120 V version
  100-120 V 250 W halogen
  200-240 V 500 W halogen
  modelling lamp socket E11

- 230 V version
  200-240 V 650 W halogen
  100-120 V 300 W halogen
  modelling lamp socket 2 x 6,35

9.3 Cooling fan

A cooling fan in the lamp base cools the flash tube and modelling lamp. It also runs when the modelling lamp is turned off.

9.4 Thermal protection

The lamp bases have been fitted with an automatic thermal protection. Should the lamp base overheat (e.g. by impeding the flow of cooling air), the modelling light is shut off. Nevertheless you may continue producing flashes.

9.5 Lamp base plugs

The lamp base plugs and sockets carry mechanical interlocks to prevent inadvertent disconnection. To unplug, push down the locking spring below the cable guide and lift out the plug.

9.6 Reflectors

Primo and Pulso lamp bases have a bayonet fitting to take reflectors.

9.7 Fuses

Only sand-filled fuses of the type indicated on the type plate may be used; otherwise the halogen lamp may explode.

10. Technical data

	Grafit 2	Grafit 4
Flash energy	1600 J	3200 J
f-stop at distance of 2 m (6 1/2 ft.), 100 ISO, reflector P70	64 2/10	90 2/10
Flash duration t 0.1 (t 0.5)	For 1 lamp: 1/250 (1/735) For 2 lamps: 1/390 (1/1200) For 3 lamps: 1/600 (1/1700)	For 1 lamp: 1/125 (1/370) For 2 lamps: 1/200 (1/600) For 3 lamps: 1/300 (1/850)
Charging time (for 100% of selected energy)	230 V / 50 Hz: 1,6 s - 0,3 s 120 V / 60 Hz: 1,9 s - 0,4 s 100 V / 50 Hz: 2,5 s - 0,4 s Can be switched to slow charging mode for low-amperage power outlets	3,0 s - 0,5 s 3,6 s - 0,7 s 4,8 s - 0,7 s
Ready display	Visual and audible (can be switched off); signals when 100 % of selected energy is reached	
Lamp base outlets	3	
Power output distribution	Symmetrical	
Controls	Illuminated silicone keyboard, resistant to dust and scratches. Wireless remote control of all functions with infrared Servor e	
Control range	4 f-stops in 1/10 or 1/3 f-stop intervals. Displayed simultaneously in joules and f-stops, joules switchable to percentage	
Modelling light	Halogen, max. 3 x 650 W at 200 - 240 V Halogen, max. 3 x 300 W at 100 - 120 V Proportional to flash energy and «full» and «low» settings. Proportionality adjustable to other broncolor power packs and their various output ranges	
Additional functions	Flash sequences, triggering delay, slow charging, ping-pong release, select from two infrared channels; etc. User-friendly menu-driven design.	
Flash release	Wireless using built-in selectable infrared receiver, sync cable, FM, FCM 2, FCC, IRX 2, IRQ	
No. of sync sockets	2	
Stabilized flash voltage	+/- 0.5%	
Standards	EC standard 73/23, UL 122	
Power requirements	Version 1: 220-240 V / 50 Hz, switchable to 120 V / 60 Hz, current consumption 10 A, longer series with shorter charging times 16 A. Version 2: 110-120 V / 60 Hz, switchable to 230 V / 50 Hz, current consumption 15 A. Version 3: 100 V / 50 Hz, switchable to 230 V / 50 Hz, current consumption 15 A.	
Dimensions	288 x 180 x 311.5 mm	288 x 180 x 407.5 mm
Weight kg	7.25 kg	10.45 kg

Subject to change in the interest of product enhancement.